

# Gardenwise

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# Message from the Director

2004 has ended with gigantic blooms proclaiming the success of an eventful and productive year. Two 79 year-old Talipot Palms in the Palm Valley, in a rare display, bloomed simultaneously. Their enormous, fluffy inflorescences bearing millions of tiny flowers were at their stunning best in December, giving visitors a once-in-a-lifetime experience (front cover and pages 22 and 23).

These palms highlight the rare and diverse flora found in the Gardens that are a source of constant delight and amazement to our many visitors. This is a strength that we have to continually nurture. Some like the Talipot Palms are the fruits of the labour of previous generations. Likewise, we have to plan and plant for future generations.

In this issue, the Gardens' Rain Forest, a rare fragment of the great forests that once covered the entire island, is given prominence (pages 10 and 11). Though it has suffered tremendous species loss over the years, its location, a short stroll from Orchard Road, the major shopping street in Singapore, makes it a priceless educational asset and a unique visitor attraction. To aid its ecological resilience, restoration planting has become a vital aspect of its management.

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Front Cover:

A general view of the two flowering palms with visitors examining the thousands of fallen flowers carpeting the ground

Photo by:

Chin See Chung

Another momentous event for 2004 was the announcement that 11.7 ha bordering the Gardens at its northeast boundary will be added to the Gardens. This land belonged to the Gardens from 1879 to 1922 when it was part of the original Economic Garden, the experimental field that spawned the Hevea rubber industry. During this period the Gardens covering 75.7 ha was at its largest extent. In 1922, 41.3 ha, comprising the northern half of the Gardens was excised for the building of an institution of higher education that evolved into the University of Singapore. Seventeen hectares were returned to the Gardens in 1986 and form its present Northern or Bukit Timah Core. This new 11.7 ha parcel will help the Gardens consolidate, and a master plan is being drawn up for its development and integration.

These additions are testimonies to the success and importance of the Gardens to the social and economic landscape of Singapore. With over three million visits a year to its current 52 ha, it is crying out for elbowroom. The staff must be congratulated for their conscientious hard work and diligence in meeting growing demands and expectations from a continually growing number of visitors.

Even as the year ended with blooming successes, 2005 began with an even bigger bang. On the 13<sup>th</sup> of January, National Development Minister, Mah Bow Tan, announced that a second botanic garden will be created for Singapore. This will be an anchor plant-based attraction in the new downtown area south of the present city centre. The horticultural and botanical renaissance in Singapore, underlined by the redevelopment of its Botanic Gardens, is blooming.

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# The Lipstick Flowers of Sabah and Sarawak, Malaysia

Lipstick Flower is the common name often given to some members of the mainly epiphytic genera *Aeschynanthus* and *Agalmyla* in the family Gesneriaceae. The name was originally applied to *Aeschynanthus pulcher* from Java, because the flower buds emerging from the cylindrical calyx tube look like ladies' lipsticks.

## Diversity

*Aeschynanthus* has approximately 160 species, the majority of which occur in the Malesian region. *Agalmyla*, a closely related genus, has at least 97.

The late Mary Mendum of the Royal Botanic Garden Edinburgh who studied Malesian *Aeschynanthus* considered that Borneo probably has 30–35 species, many endemic. Many, especially from Sulawesi and New Guinea, are not yet described. She has described several new Borneo *Aeschynanthus* species including *A. pseudohybridus* and *A. argentei*, produced a new field key for the Borneo species and was in the process of preparing an illustrated booklet on the species of the two genera for Borneo.

Recently in 2002, B.L. Burt and I.O. Hillard revised the other Lipstick Flowers in the genus *Agalmyla*, adding 62 newly described species to make a total of 97. This revision increased the number of *Agalmyla* species in Borneo to 14 with 5 being found on Mt. Kinabalu.

## Habitat and Plant Habit

This great increase in species of *Aeschynanthus* and *Agalmyla* has come with an increase in the botanical exploration of remote areas especially in Sabah and Sarawak. These are areas with a great diversity of forest types and habitats created by the large number of high mountains and a great diversity of rock formations.

Species of the genus *Agalmyla* are nearly always found in high rainfall areas, in forests with high humidity, and often in valleys near or above streams and rivers. They are often found growing up treelets from the peaty leaf litter on the forest floor. In Sabah and Sarawak, they are most common in lower montane forest and mossy forest between 600 and 1,200 m elevation. As a result they seem to be very difficult to cultivate and are rarely if ever seen in the horticultural trade and hence are little known.

*Aeschynanthus* are epiphytic, rooting in compost along branches and in tree forks. Some are also climbers. Several, like *A. tricolor*, can be seen with long trailing stems hanging down from branches over rivers and when in flower are quite spectacular. This species has now adapted to the trunks of the cultivated oil palms where their roots find a rich organic compost in the bases of the pruned palm fronds and can festoon the whole trunk.



*Aeschynanthus pseudohybridus* from mossy trees in the lower montane forests in Sabah is often associated with ant plants and *Aeschynanthus angustifolius*



*Aeschynanthus argentei* from near a limestone area at Lahat Datu, Sabah. This was the third collection ever made of this species



*Aeschynanthus tricolor* together with some ferns covering an oil palm trunk. Note the red flowers and 'bean-like' seed pods





Many climbing species needing light shade adapt very well to hanging baskets for verandahs and patios. Many of the shrubby epiphyte species are found up in the forest canopy, keeping company with a host of other epiphytes, such as ferns, orchids and ant-plants. One species found in the canopy of heath forest is *Aeschynanthus angustifolius*.



*Aeschynanthus angustifolius* with its distinctly narrow leaves and small yellow to green flowers is often found in association with ant gardens in tree canopies of heath forest

*Aeschynanthus albidus* is one of the common species found on trees overhanging rivers where breezes created along this riverine tunnel-like passage are ideal for dispersing the fine seeds.



*Aeschynanthus albidus*. An epiphytic shrub very common along rivers in Borneo, around 1,000 m. The calyx is prominently divided

*Aeschynanthus magnificus* is common in Sabah in more mossy montane forest from 1,000–1,600 m. It is often epiphytic or on the ground on steep slopes or rocky cliffs.



*Aeschynanthus magnificus* has large red to pinkish mauve flowers with a calyx that can vary from green to purple. It is common in lower montane forest above 1,000 m

### Variation in Leaves and Flowers

Lipstick plants have simple opposite leaves and if not in flower can be mistaken for climbing or shrub hoyas, but the latter have white latex.

Occasionally in *Aeschynanthus*, the leaves may be congested into whorls as in the spectacular *A. speciosus*. Leaves of *Aeschynanthus* are leathery and have smooth margins whereas those of *Agalmiyla* are thin with toothed margins and one leaf of a pair may be very much smaller than the other. *Aeschynanthus* roots from the leaf nodes only, but *Agalmiyla* roots all along the stem and are true climbers.

The inflorescences arise in the axils of the leaves or are terminal. The flowers have a prominent calyx and in both genera the calyx varies from tubular to divided to the base, depending on the species. The calyx is often prominent and brightly coloured.

The corolla tube, formed by the basal fusing of the petals, are usually red to orange or yellow and terminates in five lobes. The upper two are smaller than the lower three lobes. There are four stamens, which mature before the stigma appears. A few *Agalmiyla* species, including the two Peninsular Malaysian species, have only two stamens. The ovary is long and slender and the two-valved capsular fruits dehisce releasing numerous minute seeds with fine hairs at each end, which become airborne.



*Aeschynanthus speciosus* is one of the most spectacular species in Sabah

The variation in species can be illustrated in *Aeschynanthus curtisii* where a heath forest variety has a green calyx. Similarly *A. siphonanthus*, a montane species found at 1,000–1,600 m, usually has a green calyx tube but in plants found in Sarawak it is sometimes pinkish. *A. radicans* that grows in the same forest altitudes is easily distinguished by its small leaves. It could, however, be confused with *A. parvifolius* although that species usually has a purplish black calyx tube.



*Aeschynanthus parvifolius* with its small leaves, purple-black calyx tubes and red flowers has become a very popular hanging basket plant worldwide





*Aeschynanthus curtisii* with its glabrous calyx that can be bright red or green is a very good hanging basket plant



*Aeschynanthus siphonanthus* usually has a green calyx



A possible form of *Aeschynanthus siphonanthus* with a pinkish calyx from Sarawak



*Aeschynanthus radicans* in Sabah has small leaves and red flowers with a green hairy calyx

### Rare and Unusual

The rare *Aeschynanthus pseudohybridus* is from Gunung Alab in Sabah where the type specimen was collected in recent years.

Mountains in the north of Sarawak are also rich in species. A striking plant is the bright yellow-flowered *Aeschynanthus flavidus* from the Gunung Mulu National Park and the mountains around the Usun Apau Plateau. Another attractive species is *A. trichocalyx* with its unusual bright scarlet corolla with bright green lobes. *A. hians*, also seen in Gunung Mulu National Park in riverine forest habitats has a habit and flowers similar to *A. tricolor*, but has a wider, saucer-like calyx.



*Aeschynanthus flavidus* from northern Sarawak and Gunung Mulu Park is a spectacular yellow-flowered species





*Aeschynanthus trichocalyx* in Sarawak is unusual for the green lobes of the red corolla



*Aeschynanthus hians* from Gunung Mulu Park in Sarawak

Several other species of *Aeschynanthus* have yet to be identified and may be species new to science.



Two unidentified *Aeschynanthus* from Sabah (above and below)

## *Agalmyla*

The other genus, *Agalmyla*, with 14 species in Borneo, is rather poorly known. Their preference for cool moist conditions and the fact that they are climbers make them very difficult to cultivate. Their species are also vegetatively rather similar, making them difficult to tell apart.

Two species from Mt. Kinabalu are *Agalmyla murudensis* and *A. pseudoborneensis*. Flowering in this genus appear to be 'seasonal' but there is little information on this. When it happens though, it can be spectacular, as clusters of flowers are borne in the leaf axils all the way up the stems.

There appears to be a tremendous horticultural potential for many species of these Lipstick Flowers not yet brought into general cultivation. However, there is a lot to learn about their biology and optimal cultural conditions before any successful cultivation to produce regular and copious flowering is possible.



The genus *Agalmyla* has 14 species in Borneo, of which five occur on Mount Kinabalu, including this tentatively-named *A. murudensis*



This *Agalmyla* found in the Crocker Range in Sabah is thought to be the widespread *A. pseudoborneensis*

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# The Lesser-known Cultivated Mangoes in Singapore

In older private gardens, parks, on former village land and along waysides in Singapore, species other than varieties of the Indian mango (*Mangifera indica*) can still be found. The fruits of these mangoes, the *kuini*, *bachang*, *binjai* and *rawa* may be familiar to the older generation but except for *kuini*, few people nowadays know these trees or their fruits. The trees of these lesser-known mangoes have excellent form and in a large garden make good specimens.

## Kuini (*xMangifera odorata*)

The *kuini* is the most common of the lesser-known mangoes in Singapore as its fruits are seasonally found in local markets. They have a very strong and distinctive sweet fragrance. When not fruiting, the *kuini* can be difficult to tell apart from the Indian mango (*Mangifera indica*). *Kuini* leaves are intermediate between those of the Indian mango and the *bachang* (*Mangifera foetida*). This led to the suggestion that the *kuini* was a hybrid between the Indian mango and *bachang* (Corner, E.J.H. 1988. *Wayside Trees of Malaya*. 3<sup>rd</sup> Edition). Recent studies in molecular systematics has confirmed that *kuini* is indeed a hybrid between these two species. (Kiew, R., 2002. *Gardens' Bulletin Singapore*. 54:205).

The attractive *kuini* tree has slightly broader leaves than the Indian mango. Its flowers are pink whereas those of the mango are usually greenish. The flowers of the *kuini* have the distinctive sweet fragrance of its fruit.



*Kuini* in flower – Yio Chu Kang, Singapore

## Bachang (*Mangifera foetida*)

The vernacular names, *bachang* or *machang*, are also applied by locals to other species of wild mangoes found in the forest. It is also called Horse Mango on account of its strong flavour and turpentine smell

of the fruit, which is unbearable to some. It is also extremely fibrous. The *bachang* has a cylindrically shaped, dense crown and is a stately tree. Its leaves are leathery and stiff with a blunt or notched tip. The tree in full flower, when it is covered with pink-red flowers borne on red flower stalks, is spectacular.

I have been advised that the best way to eat *bachang* is as a chutney made from the ripe fruit.



The flowers of the *bachang* – Sembawang Road, Singapore

## Binjai (*Mangifera caesia*)

This tree when mature is a sight to behold. In the village orchard, it rivals the durian as the loftiest tree.

This tree has a large, well-tapered trunk and spoon-shaped leathery leaves. In Singapore, this tree can be deciduous, dropping its leaves during a dry spell. The resting buds are protected by a rosette of reduced leaves that look like scales. The tree rests for a period of 3-4 weeks and then springs to life with fresh young, yellow-green leaves.

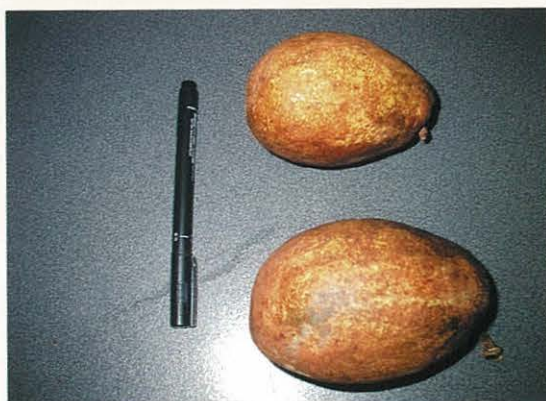
The sap of the *binjai* turns black upon exposure and is said to be an irritant like that of the *rengas* forest trees (e.g., *Gluta*, *Melanochyla* etc.), which belong to the same family, the Anacardiaceae.

The *binjai* fruits about once in 2-4 years. It generally has rather sour fruits that are best eaten in a *sambal* (a sauce with chillies). There is, however, a sweet variety with delicious fruits. The fruits of the sour variety are pear-shaped whereas the sweet ones are more rounded.





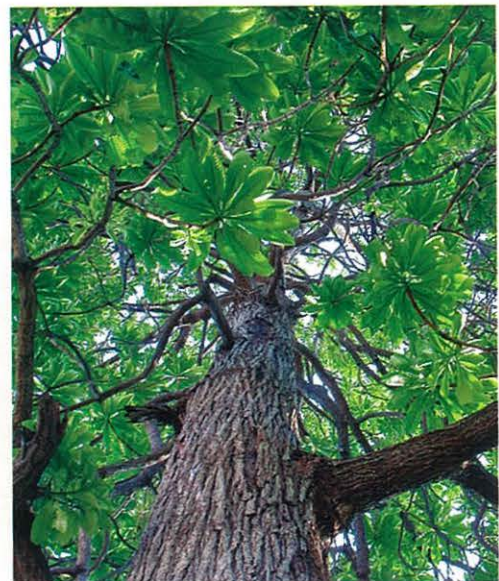
The crown of the *binjai* – off Jalan Naung, Singapore. This tree is 3.4 m in girth



The sour *binjai* (above) and the more rounded fruits of the sweet *binjai* (below)

### **Rawa (*Mangifera griffithii*)**

This tree is found in lowland forest but is also cultivated in villages in our region. In Singapore, there are records of this tree from Bukit Timah. Recently, some trees were discovered on Pulau Ubin. The largest of these is in Kampung Melayu and has a girth of 1.6 m.



Close-up of the Jalan Naung *binjai* showing the arrangement of branches and leaves

The *rawa* fruits infrequently. The fruits are small and ripen red to blackish. They almost look like plums. *Rawa* leaves are like those of the *bachang* except they are thinner and smaller. The tree has a cylindrical crown.



The Pulau Ubin *rawa*

### **Conclusion**

The mango trees described above are majestic when mature. Trees of such stature are important focal points in the landscape. Even though they do not flower frequently, their handsome crowns make them candidates for planting in larger parks in the urban environment.

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Photos by: S K Ganesan



# A Strategy for Plant Conservation in Singapore

Singapore's flora includes about 2,110 native species of seed plants, of which only 9.4% are common. The majority according to the Singapore Red Data Book of 1994 are either extinct (26%) or of conservation concern (64.6% were judged endangered, rare or vulnerable). By 'extinct', it meant extinct in Singapore, as the great majority of these 548 species also live in neighbouring countries. Only seven taxa (four species, one variety and two natural hybrids) are actually endemic to Singapore, i.e. grow nowhere else in the world, of which six are extinct (Kiew & Turner, 2003, *Gardens' Bulletin Singapore*. 55:173-184) leaving only *Cryptocoryne xtimahensis*. In view of this high level of endangerment of plant species, the Biodiversity Centre of NParks is implementing a strategy for plant conservation to ensure that species loss is minimized.

The recent shift in conservation thinking from a species-focused context has been to emphasize the conservation of habitats. The advantage of this more holistic approach is that it not only conserves a much wider range of plant species but it protects all the habitat requirements of endangered species, such as the population of pollinators, dispersers and symbiotic partnerships, such as mycorrhizal associations. In addition, it provides a habitat for animal species too. This new initiative to conserve habitats has come under the umbrella of the Important Plant Areas (IPA) Programme.

## Important Plant Areas

IPAs are habitats that are home to a high plant biodiversity, threatened species or iconic species, such as pitcher plants (*Nepenthes* species). By conserving a network of such sites, maximum biodiversity can be conserved.

The first step is in identifying and defining habitat types. In the Singapore context, 27 habitat types are recognized from marine to terrestrial, wetland to dryland, and primary to secondary habitats. In the context of IPAs, among these a minimum of five best sites are selected for each habitat.

A strong emphasis of the Strategy for Plant Conservation is the understanding and documentation of plant biodiversity. Only with comprehensive data can conservation decisions be made. Here the Singapore Herbarium plays a role as the database of Singapore specimens covering 129 years of collections with information on species distribution and rarity. In addition, ground surveys are conducted to record the current flora and to assess the conservation status of threatened species. The Biodiversity Centre spent a year surveying all sites of conservation concern and the Herbarium has carried out detailed surveys of key areas. One was a survey of the coastal forest, one of the endangered habitats in Singapore, at Chek Jawa on Pulau Ubin, which documented the occurrence of 11 extinct species, 11 endangered and 16 vulnerable species (Lee *et al.*, 2003. *Gardens' Bulletin Singapore*. 55:271-307).

Documentation is essential for making comparisons between sites in order to choose the best five. A standard format has been drawn up in order to capture the maximum pertinent information. The example given here is for the Singapore Botanic Gardens Rain Forest, which is one of the IPAs chosen to represent primary lowland rain forest.

Data such as these on the Gardens Rain Forest are gradually being gathered so that the five sites for each habitat type can be identified. This reveals that some habitat types are critically endangered as there are less than five sites left in Singapore.



Chek Jawa Rocky Shore



One Important Plant Area is the offshore mudflats at Pulau Ubin, Chek Jawa where the 'extinct' *Halodule pinifolia* was discovered



Haji Samsuri, a veteran of the Singapore flora, plays an important role in identifying rare and endangered species. Here he is amidst a patch of *Pennisetum purpureum*.



# IMPORTANT PLANT AREAS

## Site: Singapore Botanic Gardens Rain Forest

### Location and Size

103° 49' 4" E, 1° 18' 46" N  
Approximately 6.1 ha

### Habitat/ Vegetation type

Primary Lowland Tropical Rain Forest

### Species Richness

314 native species of green plants<sup>1</sup>

(Note: This comprises 220 species recorded prior to 1994 plus 94 species collected by Turner *et al.*)

The fungal flora is also diverse but no species list exists for them.

### History of Disturbance & Uses

The Gardens Rain Forest has from early times existed as a fragment surrounded by cultivated areas and then from 1875 by the Gardens itself. In addition, excision and the building of roads and pathways have encroached on its integrity. The edge effect has become particularly serious in recent times. The effect of all this is seen from the statistics in the table, which shows a drastic reduction of about 50.9% in biodiversity (species loss) since Ridley made collections at the turn of the last century. Most vulnerable have been the forest floor herbs and shrubs, which live in conditions of deep shade and high humidity, followed by epiphytes and climbers.

One reason for this high level of species loss is change in microclimate due to the edge effect, because the Gardens Rain Forest being a forest fragment is more open to wind, which lowers the relative humidity and raises temperatures in the undergrowth. The microclimate is further affected when old trees fall leaving gaps in the canopy (see below).

Another cause of disturbance is the presence of exotic species that were introduced for 'aesthetic' reasons. There are now 80 introduced species established in the Rain

Forest<sup>1</sup>, the most aggressive ones being herbs, such as *Costus lucanusianus* (Costaceae), *Heliconia psittacorum* (Heliconiaceae) and *Thaumatococcus daniellii* (Marantaceae); climbers, such as *Dioscorea sansibarensis* (Dioscoreaceae), *Thunbergia grandiflora* (Acanthaceae) and *Tanaecium jaroba* (Bignoniaceae); and trees, such as *Castilla elastica* (Moraceae). These aggressive alien species compete with the indigenous ones and upset the ecological balance in so small a tract.

A further cause is 'enrichment' planting. This is evidenced by the presence of indigenous fruit trees (see below) that are present in much great abundance (species number) than is normal in a patch of rain forest of this size<sup>2</sup>.

### Number of species under threat

Based on the Singapore Red Data Book<sup>3</sup>, the number of species at risk in Gardens Rain Forest is 15% that of the total flora in Singapore, of which, 82.2% fall within the rare (155 spp.), vulnerable (74 spp.), endangered (19 spp.) and 'extinct' (10 spp.) species categories. The 'extinct' species include: *Agelaea macrophylla* (Connaraceae), *Alseodaphne nigrescens* (Lauraceae), *Atuna racemosa* (Chrysobalanaceae), *Diospyros conferta* (Ebenaceae), *Epipremnum pinnatum* (Araceae), *Gnetum latifolium* (Gnetaceae), *Horsfieldia irya* (Myristicaceae), *Lasianthus tomentosus* (Rubiaceae), *Kayea elegans* (Guttiferae) and *Pandanus tetradon* (Pandanaceae).

### Endemic Status

Green plants - none  
Fungi - not known

### Iconic/ Cultural Importance

Many of the old and large trees are timber species in the Dipterocarpaceae. Their size and age give them iconic and cultural

significance as Heritage Trees. The tallest trees found in the forest<sup>2</sup> are *Dyera costulata* (Apocynaceae) and *Shorea gratissima* (Dipterocarpaceae), both of which exceed 55 m in height. Other tall trees that exceed 45 m in height are: *Koompassia malaccensis* (Leguminosae), *Scaphium macropodium* (Sterculiaceae), *Shorea leprosula*, *S. macroptera*, *S. pauciflora*, *S. ovalis* (Dipterocarpaceae) and *Terminalia subspatulata* (Combretaceae), the last with an impressive height of 47 m and a girth of 6.5 m has been officially designated a Heritage Tree of Singapore.

Other iconic plants include an impressive specimen of *Ficus kerkhovenii* (Moraceae) with a massive aerial roots system.

### Scientific Importance

The Gardens Rain Forest has also been a long-term research site, first by Ridley-Hill-Turner, and still on-going. It is also an important type-site for several fungi<sup>4</sup> and for the Singapore Roundleaf Horseshoe Bat (*Hipposideros Ridleyi*).

### Economic Importance / Traditional Uses

The forest contains many species of economic value for timber, edible fruits/seeds, medicinal purposes, etc. It is a seed source and gene pool.

Many Dipterocarpaceae are valued for their timber, from furniture making to boat planking, such as *Anisoptera megistocarpa*, *Hopea griffithii*, *H. mengarawan*, *Shorea curtisii*, *S. gratissima*, *S. leprosula*, *S. ovalis*, *S. parviflora*, *S. pauciflora*, *Vatica rassak* and *V. ridleyana*. The soft, light and fine-grained wood of *Dyera costulata* (Apocynaceae) is used for making pencils. The hard heartwood of *Dialium indum* (Leguminosae) is used as crushing rollers, while that of *Koompassia malaccensis* (Leguminosae), when impregnated with preservative is used as railway sleepers. That of *Palaquium obovatum* (Sapotaceae) is used for house building and boat planking. Palms such as *Oncosperma tigillarium* (Palmae) have hard durable trunks that withstand seawater and are used as estuarine fishtraps in *kelong*. Rattans, such as *Daemonorops grandis* and *Korthalsia rostrata*, are used in basket making and strings for tying purposes<sup>7</sup>.

Besides fruits that are commercially sold in the market, such as *Artocarpus integer* (Moraceae), *Durio zibethinus* (Bombacaceae), *Garcinia mangostana* (Guttiferae), *Lansium domesticum* (Meliaceae) and *Nephelium lappaceum* (Sapindaceae); other edible fruits found in

Native Species loss by habit between 1900 and the 1990s<sup>1</sup>

Habit	No. native species recorded prior to 1994	No. native species lost	Species loss (%)
Herbs	14	12	85.7
Shrubs	38	28	73.7
Epiphytes	6	4	66.7
Climbers	104	63	60.6
Trees	286	121	42.3
<b>TOTAL</b>	<b>448</b>	<b>228</b>	<b>50.9</b>



the Gardens Rain Forest include *Baccaurea motleya* (Euphorbiaceae) and *Sandoricum koetjape* (Meliaceae). Edible seeds include *Castanopsis inermis* (Fagaceae), *Dialium indum* (Leguminosae), *Elateriospermum tapos* (Euphorbiaceae) and *Scaphium macropodium* (Sterculiaceae), the last yields a large quantity of mucilage when soaked, which is an important ingredient in the dessert, 'cheng tng'. However, Kiew & Chan (2001) pointed out that the high number of forest fruit trees is probably an artifact from past 'enrichment' planting<sup>2</sup>.

Of medicinal value are *Eurycoma longifolia* (Simaroubaceae), the famous Tongkat Ali used in traditional Malay medicines. The latex of *Ficus grossularioides* (Moraceae) is an ingredient of plasters applied to temples to treat headache; medicinal oil are derived from leaves of *Lindera lucida* (Lauraceae) and the juice of *Stenochlaena palustris* (Blechnaceae) is used to treat skin diseases<sup>7</sup>.

Other useful species include *Aquilaria malaccensis* (Thymelaeaceae), *kayu gaharu* or agar wood, for incense and *Palaquium gutta* (Sapotaceae) and *Dyera costulata* (Apocynaceae), whose latex was once of commercial value<sup>7</sup>.

#### Role as Keystone Habitat/ Species

*Amphidromus inversus* is an Asian endemic but in Singapore known only from the SBG Rain Forest. It is an arboreal snail that lives mainly in the forest canopy<sup>5</sup>.

*Ficus kerkhovenii* and *Ficus variegata* are among the species that provide food for birds and other small animals that live in the forest. In a bird survey compiled by K.S. Lim in 1998<sup>8</sup>, 9 or so species are considered forest-dependent species (G. Davison pers. comm.). These are the Rufous Woodpecker, Banded Bay Cuckoo, Long-tailed Parakeet, Thick-billed Green Pigeon, Jambu Fruit-dove, Crested Goshawk, Hill Myna, Little Spiderhunter and Abbott's Babbler.

The Slender Squirrel (*Sundasciurus tenuis*) and Common Treeshrew (*Tupaia glis*) are some of the animals that inhabit the Gardens Rain Forest.

A 3-month survey on termites yielded 22 species. This is high compared with 70 species collected over several years from Bukit Timah NR and CCNR<sup>6</sup>.

The Gardens Rain Forest supports a rich flora of ephemeral macro-fungi<sup>4</sup>. About 900 fungal specimens were collected from it.

#### Present Threats to the Habitat

The major threat to the habitat is the poor regeneration of the tree species. More than half the tree species are represented by only one or two individuals. When these old trees fall, they leave large gaps in the canopy that prevent the regeneration of primary forest species that require shade, high humidity and low temperatures for their germination.

These gaps are being invaded by secondary forest species like *Macaranga gigantea*, *M. heynei*, *M. conifera* (Euphorbiaceae), *Ficus grossularioides* (Moraceae), *Fagraea fragrans* (Loganiaceae), *Melastoma malabathricum* (Melastomataceae), *Andira inermis* (Leguminosae), *Rhodamnia cinerea* (Myrtaceae), *Anisophyllea disticha* (Anisophylleaceae) and *Murdannia nudiflora* (Commelinaceae).

Another serious threat is the rampant growth of woody climbers on the edge of gaps. These include *Smilax setosa* (Smilacaceae), *Ficus apiocarpa* and *F. villosa*. Their heavy crowns bring down trees on the edge of gaps and they produce twiggy debris several feet deep that prevent any regeneration.

It is also thought that there is a failure in regeneration due perhaps to low seed production, because the pollinator population is low or no longer present; low viability of seed caused by inbreeding depression; or due to extensive seed predation by resident squirrels.



The Gardens Rain Forest, only 15 minutes stroll from Orchard Road, Singapore's premier shopping street, is a popular destination

#### Site Stability

From the above, historic species loss is probably due to the edge effect due to the small size of the Gardens Rain Forest as evidenced by the greatest loss of herbs, shrubs and epiphytes.

#### Future site stability is affected by:

1. lack of regeneration of tree species. Because many of these are represented by one or two individuals, this will lead to species loss in the near future as many of the trees are old and reaching the end of their life. Being large they are also vulnerable to lightning strike.
2. rampant growth of aggressive climbers has not been checked and is causing death of the trees they cover and their twiggy debris prevents regeneration.
3. presence of secondary forest species and exotics also reduce the chance of the primary forest species from regenerating.

4. the edge effect is serious and is another factor in preventing the continued existence of understorey species and the regeneration of primary forest species.

#### Conclusion

Species loss will continue and gradually the rainforest structure with emergents and a continuous middle tree layer will be lost. While species loss is not obvious, the changes in forest structure are becoming obvious.

Remedial work has been attempted, such as planting large 3-4 m tall saplings of *Hopea odorata*, *Dracontomelon dao*, *Sterculia cordata*, *Palaquium obovatum*, *Elaeocarpus angustifolius* and *Dipterocarpus kunstleri* in canopy gaps. Ripe seeds from trees in the rain forest are being gathered, for growing to a good size in the nursery before planting back. This has the advantage that they would be of the same genetic stock. Unwanted exotic species should be removed, especially the prolific *Dioscorea sansibarensis*, but also the herbs *Dieffenbachia*, *Costus lucanusianus*, *Heliconia psittacorum* and *Thaumatococcus daniellii*; and climbers *Thunbergia grandiflora* and *Tanaecium jaroba* and trees like *Paraserianthes falcata* and *Castilla elastica*. However, these efforts have yet to show signs of halting the prevailing degradation of the Gardens Rain Forest.

#### Published Data:

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Serena Lee, Gwee Aik Teck &  
Paul Leong  
Herbarium



## Extinct Species

The good news is that many of the species listed as extinct in the 1994 Red Data Book have been re-found and this has been a focus of plant surveys carried out by the Herbarium and Biodiversity Centre. Specimens are deposited in the Herbarium as a permanent record and as verification of the identity of the specimen.

Re-finding extinct species is, however, not the end of the story. These species are often extremely rare and are not found in viable populations. This is where we need help from our colleagues in the nurseries or tissue culture lab to propagate the plants, and park management and arboriculture officers to increase the population size through *ex situ* conservation by planting them in appropriate sites throughout Singapore.

Table of 'Extinct' species re-found by staff from the Herbarium, Biodiversity Centre and the Nature Reserves.

Family	Species	Last collected
Acanthaceae	<i>Strobilanthes palawanensis</i>	2003
Adiantaceae	<i>Adiantum hispidulum</i>	2002
Apocynaceae	<i>Anodendron candolleianum</i>	1996
	<i>Parameria laevigata</i>	1997
	<i>Willughbeia edulis</i>	2004
	<i>Wrightia laevis</i>	2004
Asclepiadaceae	<i>Tylophora indica</i>	2004
Commelinaceae	<i>Amischotolype marginata</i>	2004
Connaraceae	<i>Agelaea macrophylla</i>	2004
	<i>Connarus planchonianus</i>	2003
Cycadaceae	<i>Cycas rumphii</i>	2004
Cymodoceaceae	<i>Halodule pinifolia</i>	2003
	<i>Halodule uninervis</i>	2003
Cyperaceae	<i>Cyperus iria</i>	2002
Dipterocarpaceae	<i>Cotylelobium lanceolatum</i>	2004
	<i>Hopea sangal</i>	2002
Ebenaceae	<i>Diospyros sumatrana</i>	1997
	<i>Diospyros venosa</i>	2004
Euphorbiaceae	<i>Macaranga recurvata</i>	2004
Fagaceae	<i>Lithocarpus hystrix</i>	1997
	<i>Castanopsis malaccensis</i>	2003
	<i>Lithocarpus wallichianus</i>	2003
Flacourtiaceae	<i>Casearia lobbiana</i>	1996
Gnetaceae	<i>Gnetum latifolium</i>	2003
Guttiferae	<i>Kayea elegans</i>	2003
Haloragaceae	<i>Gonocarpus chinensis</i>	2002
Hernandiaceae	<i>Hernandia nymphaeifolia</i>	2003
Hydrocharitaceae	<i>Thalassia hemprichii</i>	2003
Hymenophyllaceae	<i>Cephalomanes singaporeanum</i>	2002
Labiatae	<i>Anisomeles indica</i>	1997
	<i>Pogostemon auricularius</i>	2003

Family	Species	Last collected
Lauraceae	<i>Cryptocarya griffithiana</i>	2004
	<i>Litsea myrsiticifolia</i>	2004
Lecythidaceae	<i>Barringtonia reticulata</i>	2004
Leeaceae	<i>Leea aequata</i>	1997
	<i>Leea rubra</i>	1997
Leguminosae	<i>Derris scandens</i>	1996
Melastomataceae	<i>Memecylon fruticosum</i>	2003
Meliaceae	<i>Aglaia simplicifolia</i>	2003
	<i>Chisocheton erythrocarpus</i>	2003
Moraceae	<i>Antiaris toxicaria</i>	2002
	<i>Ficus sundaica</i>	2003
Myristicaceae	<i>Horsfieldia irya</i>	1996
	<i>Horsfieldia tomentosa</i>	2003
	<i>Knema globularia</i>	2003
Myrtaceae	<i>Syzygium linocerooides</i>	2003
Palmae	<i>Calamus erinaceus</i>	2002
Pandanaceae	<i>Pandanus tetrodon</i>	2003
Rhizophoraceae	<i>Bruguiera sexangula</i>	2002
	<i>Kandelia candel</i>	2003
Rubiaceae	<i>Aidia auriculata</i>	2003
	<i>Lasianthus cyanocarpus</i>	2003
	<i>Lasianthus ellipticus</i>	2003
	<i>Morinda ridleyi</i>	1997
	<i>Psychotria angulata</i>	2001
	<i>Psychotria griffithii</i>	1998
	<i>Saprosma glomerulata</i>	1998
Sapindaceae	<i>Arytera littoralis</i>	2004
Sterculiaceae	<i>Scaphium linearicarpum</i>	1996
	<i>Waltheria indica</i>	2004
Thymelaeaceae	<i>Aquilaria microcarpa</i>	2003
Verbenaceae	<i>Peronema canescens</i>	2000
Vitaceae	<i>Pterisanthes eriopoda</i>	2002
Vittariaceae	<i>Antrophyum callifolium</i>	2003

Hopefully, by a combination of habitat protection and maintaining viable populations of endangered species, Singapore can meet its target of preventing further species loss.

Serena Lee, Hj. Samsuri Ahmad, Paul Leong,  
Gwee Aik Teck & Ruth Kiew  
Herbarium

## REDISCOVERY OF EXTINCT NATIVE ORCHIDS

About 80% of the native orchid species that existed in Singapore are epiphytic. Most deforestation occurred between 1819 and 1900 and subsequent urbanization saw further depletion of the forest trees and their cargo of orchids.

There are 196 orchid species recorded from Singapore (Turner, 1994, *Botanical Journal of the Linnean Society*, 114:217). Of these, 188 are confirmed from Herbarium records. The Singapore Red Data Book lists 85% of them as 'Extinct'. This figure could be too stringent as many orchids, being epiphytic, are perched high up amongst the branches, rendering accountability during survey difficult. However, it gives an inkling as to the rarity of our wild orchids.

Paul Leong  
Herbarium

Photos by: Paul Leong



Ten of these 'Extinct' species were recently rediscovered in our forests during recent surveys by staff from the Herbarium, Biodiversity Centre and the Nature Reserves.

Species	Last Herbarium Record	Collector	Locality	Recent Finding	Locality Of Recent Finding
<i>Agrostophyllum stipulatum</i>	1891	Ridley, H. N.	Not mentioned	2004	Lim Chu Kang
<i>Arachnis hookeriana</i>	1930	Carr, C. E.	Seletar	2002	Pulau Tekong
<i>Bulbophyllum apodum</i>	1933	Corner, E. J. H.	Jurong	2002	Pulau Tekong
<i>Bulbophyllum sessile</i>	1955	Sinclair, J.	Mac Ritchie Reservoir	2002	Pulau Tekong
<i>Coelogyne mayeriana</i>	1930	Corner, E. J. H.	Chua Chu Kang	1999	Holland Village *
<i>Cymbidium bicolor</i> <i>ssp. pubescens</i>	1896	Ridley, H. N.	Jurong	2004	Sungei Buloh
<i>Dendrobium flexile</i>	1893	Ridley, H. N.	Bukit Timah	2002	Pulau Tekong
<i>Dendrobium revolutum</i>	No Date on Specimen	Ridley, H. N.	Wayang Path	2003	Mandai
<i>Dendrobium subulatum</i>	1907	Ridley, H. N.	Kranji	2001	SBG Rainforest on fallen tree
<i>Liparis ferruginea</i>	1889	Ridley, H. N.	Ang Mo Kio	2002	Tampines field between Ave. 8 and 10

\* Found on old rain tree at Holland Village junction. Unfortunately, the plant was removed and lost in 1999.

Three species are illustrated below:

#### *Agrostophyllum stipulatum*

Herbarium records show a specimen was collected by H.N. Ridley in 1891. However, its locality of collection was not mentioned. Earlier this year, a clump was found in Poyan, Lim Chu Kang, in a cemetery. The orchid is epiphytic on a shrub growing in the cemetery.



*Agrostophyllum stipulatum*



Flowers of *Agrostophyllum stipulatum*

#### *Bulbophyllum apodum*

Herbarium records show collections by H.N. Ridley in 1890 from Kranji, 1892 from 'Chan Chu Kang' (now submerged partly within the Upper Seletar Reservoir) and Kranji and by E.J.H. Corner in 1933 from Jurong. A recent survey in 2002 found this species on a mangrove tree in Unom, Pulau Tekong.



*Bulbophyllum apodum*



Inflorescence of *Bulbophyllum apodum*

#### *Cymbidium bicolor ssp. pubescens*

Herbarium specimens were collected by H.N. Ridley, from Sungei Buloh in 1891 and Jurong in 1896. A clump was discovered perched on a mangrove tree in Sungei Buloh, just last year.



*Cymbidium bicolor ssp. pubescens*



Flowers of *Cymbidium bicolor ssp. pubescens*



# Public Exhibition: Nature in the Gardens



Young admirers at the exhibition

The Gardens Public Exhibition programme sponsored by ExxonMobil Asia Pacific Pte Ltd is a changing nature photography exhibition held at the Visitor Centre, which has received very positive feedback from the public. Collaborations with various established photography societies and well known photographers have yielded interesting exhibits. Recent exhibitions include, 'Alternatives' featuring nature looked at from an alternative, artistic point of view, while 'Nature in the Gardens' featured plants and wildlife found in the Botanic Gardens. Themed exhibitions held to coincide with major events are extremely popular. Christmas plants and Chinese New Year plants were the highlight during the festive season, and Gingers and Heritage Orchids the focus for the launch of the Ginger Garden and the Singapore Orchid Festival respectively.

Selected photographs from the exhibition 'Nature in the Gardens' are featured here. This exhibition, organized in collaboration with the Nature Photographic Society (Singapore)\*, was made possible with contributions from members of the society.

**Camille Foo**

Visitor Management & Education

\* [www.naturephotosociety.org.sg](http://www.naturephotosociety.org.sg)



**Frangipani (*Plumeria rubra*):** The frangipanis are indigenous to the New World tropics from southern Mexico to northern South America. They are now commonly found in all tropical areas of the world.



**Green Crested Lizard (*Bronchocela cristatella*) with Ant:** This native lizard is commonly found along forest fringes in Singapore. The crest on the males rises higher than that of the female. The green-crested lizard can be spotted in the Gardens Rain Forest.





Aaron Leung

**Pink Waterlily (*Nymphaea*):** There are about 50 different species of *Nymphaea* waterlilies in the world. With their majestic floating leaves and beautiful flowers, water lilies add a gentle dash of colour to our lakes and ponds. This picture was taken at the Sundial Garden.



Elzel Romero

**Dragonfly (*Diplacodes trivialis*) on bud of *Nymphaea*:** Dragonflies, which feed on smaller insects, need a stable environment not far from water for adult dragonflies to feed and use as perching sites. This picture was taken near the Sundial Garden.



Fong Chee Wei

**Lotus (*Nelumbo nucifera*) in full bloom:** The lotus flower when in full bloom measures up to 25 cm across. Both flowers and leaves sometimes grow over a metre above the water. This image was taken at Symphony Lake in the early morning with a wide angle lens.

**Dragonfly (*Neurothemis ramburii*) on leaf:**

Dragonflies are commonly found around ponds where they emerge from their larvae that lives on the bottom of ponds. This one was spotted perching on an aquatic plant in the pond at the Plant House.



Tim Boon-Han

**Purple Waterlily (*Nymphaea*):**

This purple waterlily grows in the pond at the Sundial Garden. The morning light illuminated the flower but not the surroundings, giving a spotlight effect.



Yeo Wee Han



Aaron Leung

**White-handed flies (*Diptera*):** This is a pair of mating white-handed flies. This species is found in gardens and forests rubbing their white 'hands'. This pair was spotted near Swan Lake.



# Furtado and Aroids

**Caetano Xavier Furtado (1897 – 1980)** was born in Goa, India, and studied agriculture for his BSc at Poona. On graduating in 1921, he worked at first for the Forestry Service in Burma before joining in 1923 the Singapore Botanic Gardens as field assistant. He was in charge of the naming of the living collection, as well as being in charge of the library and working in the herbarium. By 1927, he was promoted to Assistant Botanist. In 1940, he gained a DSc from Bombay, India, based on his research on palms. He remained as Assistant Botanist until he retired in 1952 when he was immediately re-employed in the same capacity. In 1956, his title was upgraded to Botanist. He retired for a second time in 1960 but continued to work in the Singapore Herbarium until at least 1970. His research work focused primarily on palms (D.V. Johnson & E.P. Tay, 1999. *Gardens' Bulletin Singapore*. 51:141-150) and secondarily on aroids.

**Furtado's Contribution to Aroid Taxonomy** has been overlooked, in part because his Kinabalu specimens were distributed under Clemens numbers, and partly because his taxonomic career was based in Singapore.

For aroids, Furtado was involved in three field collecting trips:

- In March and April 1932, Furtado spent six weeks on the Clemens Expedition to Gunung Kinabalu where he concentrated on collecting palms and aroids. His specimens were distributed under Clemens numbers, which is perhaps the reason that his name is not included among those who collected monocots from Kinabalu (J.H. Beaman & R.S. Beaman, 1998. *The Plants of Mount Kinabalu. 3. Gymnosperms and Non-orchid Monocotyledons*). He discovered several new aroid species, which he subsequently described: *Homalomena gillii*, *H. kinabaluensis*, *Pothos borneensis*, *P. kinabaluensis*, *Rhaphidophora kinabaluensis* and *Schismatoglottis retinervia*.
- Between 20<sup>th</sup> May and 19<sup>th</sup> June 1937, he collected in Peninsular Malaysia from Kedah (Baling and Wang), Perak (Kroh, Taiping, Gopeng and Tapah), west Pahang (Raub and Bentong) and Negri Sembilan (Gunung Angsi and Gunung Beremban).
- In 1939, he collected in the Pontian area of Johore, Peninsular Malaysia.

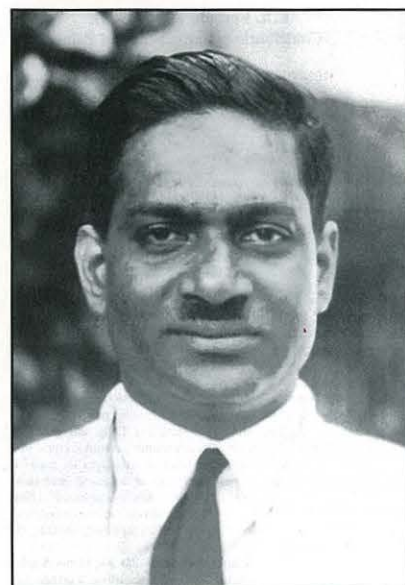
**His three major publications on aroids** appeared in the *Gardens' Bulletin*.

- Furtado, C.X. 1935. Araceae Malesicae. *Gardens' Bulletin Straits Settlements*. 8: 145-158.
- Furtado, C.X. 1939. Araceae Malesicae. II. Notes on some Indo-Malaysian *Homalomena* species. *Gardens' Bulletin Straits Settlements*. 10:183-238.
- Furtado, C.X. 1959. A new aroid from Sarawak. *Gardens' Bulletin Singapore*. 17: 276-278.

## NEW SPECIES DESCRIBED BY FURTADO

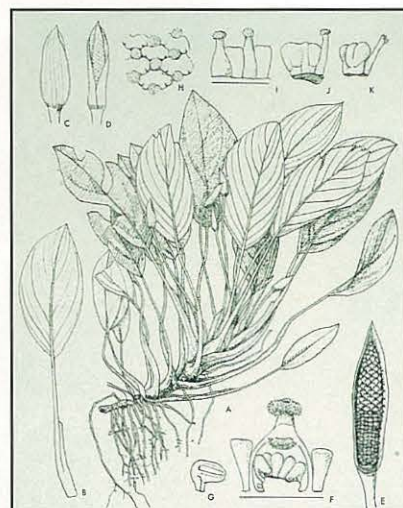
GENUS	NUMBER OF SPECIES
<i>Homalomena</i>	12
<i>Pothos</i>	2
<i>Cryptocoryne</i>	1
<i>Microcasia</i>	1
<i>Rhaphidophora</i>	1
<i>Schismatoglottis</i>	1

(Based on a poster presented at The 9<sup>th</sup> International Aroid Conference in Kuching, Sarawak, in November 2004).



Hassan Ibrahim

In 1981, M. Hotta described a new genus, ***Furtadoa***, which in 1935 Furtado had already recognized as probably a new genus but material available to him then was not sufficient for him to describe it as such. Hotta named the new genus in honour of C X Furtado in recognition of his contribution to 'our knowledge of Malesian Araceae'.



*Furtadoa sumatrensis* M. Hotta  
In Acta Phytotax. Geobot. 32(1981)142-145

Hassan Ibrahim

Ruth Kiew  
Herbarium



# The Singapore Herbarium - The Type Project

HERB. MORT. BOT. SING.  
NO. 1000  
Published in  
The Bot. (1900) 1: 1



## Introduction

The Singapore Herbarium (founded in 1875) houses about 650,000 herbarium specimens from Singapore and the region. This includes more than 5,000 type specimens stored separately from the general collection. One of our current projects involves a complete databasing and digital imaging of our type collections.

## Aim

This project allows easy access and viewing of our type collection database via the website. Full digital images of these types are also included. The project is carried out to make the types widely accessible and to allow for a permanent record of the types as images.

## Acknowledgement

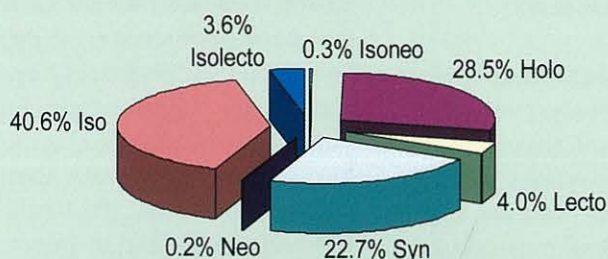
We are grateful to the Asean Regional Centre for Biodiversity and Conservation (ARCBC) for providing a grant to allow this project to be carried out.

## 2. Type Imaging

The type project includes:

- Verification of the type status and citation of the relevant publication.
- Barcoding and data-capture into BRAHMS database.
- Image-capture.
- Linkage of data to corresponding image for the

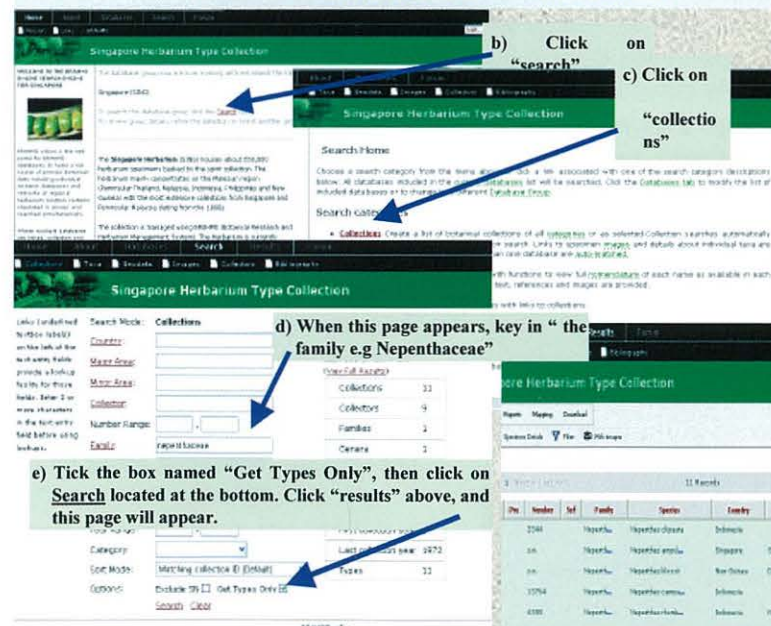
## 1. Type Status Distribution



## 5. Website Walk-Through

Details and images of our type collection can be viewed in the website:  
<http://herbaria.plants.ox.ac.uk/bol/?singapore>.

This website can be viewed via NParksConnect and SBC's website.



## 3. Types by Collector

Collector	Total Types	Collector	Total Types
Ridley, H.N.	871	Ramos, M.	71
Curtis, C.	439	Ledermann, C.	61
King's collector	315	Burkill, I.H.	55
Wray, L. Jr.	210	Clemens, J.; Clemens, M.S.	53
Carr, C.E.	203	Kloss, C.B.	50
Haviland, G.D.	192	Robinson, H.C.	48
Elmer, A.D.E.	171	Mohd Nur	47
Corner, E.J.H.	138	Forbes, H.O.	44
Scortechini, B.	96	Holtum, R.E.	38
Henderson, M.R.	81	Goodenough, J.S.	33

## 4. Types by Family

Family	Total no. of Species
Orchidaceae	554
Euphorbiaceae	292
Melastomataceae	213
Leguminosae	198
Zingiberaceae	142
Araceae	131
Gesneriaceae	131
Annonaceae	117
Ebenaceae	93
Ericaceae	92

f) Click on any of these little cameras to get an image of the type.

Ruth Kiew, Hassan Ibrahim, Serena Lee  
Herbarium

(Based on a poster presented at the 6th Flora Malesiana Symposium, Manila, the Philippines, in September 2004. For more information on the type project, see *Gardenwise* 23: 21-23).



## Events

The well-loved National Orchid Garden received a refreshing new look with added interesting attractions. The enhancements to the Garden were unveiled to the media on 28 June 2004. The Cool House, a conservatory to simulate a tropical montane forest filled with beautiful orchid species, was a key highlight. The fragrant orchid display in the Tan Hoon Siang Mist House entices visitors to smell the orchids while the Yuen-Peng McNeice Bromeliad Collection showcases a new landscape with a winding stream to enhance the glorious hues of this interesting collection.



The new look of the Yuen-Peng McNeice Bromeliad Collection

**The Gardens' 2005 Calendar** was launched on 25 September 2004. Paying tribute to wild orchid species, the calendar showcases an outstanding selection of these orchids photographed by our orchidologist Dr Jaap Vermeulen. The calendar is a joint community project with ExxonMobil Asia Pacific Pte Ltd. All proceeds from the sale of the calendar support the Singapore Botanic Gardens Exhibition Programme. The calendar has been a great success, all were sold out within weeks of the launch. A Charity Fair featuring numerous plant stalls was held in conjunction with the calendar launch to raise funds for the President's Challenge, with ExxonMobil

Asia Pacific Pte Ltd donating \$2 to the President's Challenge for every calendar sold.

**The Evolution Garden Book** was launched on 13 November 2004. This informative guide was the result of a positive collaboration with the Rotary Club of Singapore and was sponsored by Crocodile International. The book helps to interpret the Gardens' new attraction, the Evolution Garden, which is a garden specially designed to bring visitors through different periods of our planet's history through innovative landscapes and plants.

**The annual Fiesta in the Gardens** held in the first weekend in December continued to attract great numbers of visitors to the Gardens. The gaily decorated Christmas trees trimmed by various Embassies, High Commissions and Gardens' partners at the Visitor Centre was a major attraction for all who came to the Gardens. With many decorations specially brought from the respective countries and reflective of the culture of the countries, the display was befitting of the international status of the Gardens as a popular gathering point for the many nationalities. Walking tours were conducted to introduce to visitors the Gardens' numerous offerings, ranging from the Evolution Garden to the Ginger Garden and the National Orchid Garden. Creative and interesting workshops introducing children both to nature and to art were extremely popular. Plant and gift stalls lining the walkways from the Visitor Centre to Orchid Plaza made for an interesting shopping experience in the lush outdoors.



Christmas tree decorations by various embassies and Gardens' partners

**The Gardens Photography Competition** was held in the months of June to September 2004, in partnership with the Photographic Society of Singapore and prize sponsor Nikon. Themed on the Gardens, photography enthusiasts could capture the beauty of the Gardens and submit their entries under five categories, Plants (other than Orchids), Orchids, Landscape, Lifestyle and Nature. The competition attracted an astounding 1,700 over entries.

The Gardens had the honour of hosting several **visiting dignitaries** who had the Gardens' new orchid hybrids named after them to commemorate their visit. They were: Prime Minister of the State of Kuwait, HH Sheikh Sabah Al-Ahmed, Crown Prince of Perak, Malaysia, HRH Raja Nazrin, Prime Minister of Ireland, HE Bertie Ahern, King and Queen of Norway, HM Harald V and HM Sonja and the Earl of Wessex, HRH Prince Edward. The orchids named in their honour were *Dendrobium* Sheikh Sabah Al-Ahmed, *Dendrobium* Raja Nazrin, *Mokara* Bertie Ahern, *Dendrobium* Sonja and *Aerides* Edward, respectively.

The Gardens also named *Dendrobium* Paquale Pistorio 'Lisa' and *Spathoglottis* Jane Goodall after celebrated individuals Mrs Paquale Pistorio, wife of Honorary Citizen Pasquale Pistorio and Dr Jane Goodall, world-renowned primatologist and conservationist, and *Dendrobium* Rotary Club of Singapore after the Gardens' partner in several projects, the Rotary Club of Singapore.

**The Gardens' concert program** for the second half of 2004 focused on outstanding local talent. Jazz veteran Jeremy Monterio and the Thomson Jazz Band attracted thousands of jazz fans while child prodigy Clare Yeo wooed the audience with her piano performance. The Singapore Youth Festival Band Fiesta continued to soar in popularity attracting many local supporters and the Singapore Symphony Orchestra and Singapore Chinese Orchestra drew standing ovations from their appreciative audiences.



The Holland-Bukit Panjang Group Representation Constituency's (GRC) **National Day Observance** celebration transformed Palm Valley into a joyous sea of red and white as many proudly wore our national colours, with Minister Lim Swee Say and the other Members of Parliament of the GRC celebrating our Nation's 39<sup>th</sup> National Day together in the Gardens.

*Camille Foo*  
Visitor Management & Education



A valley of red and white during the National Day 2004 observance ceremony

## Connecting Plants with People – The Gardens' Pocket Guides

In the pipeline is a series of **Pocket Guides** to various aspects of the Gardens with the aim of showing the visitor what to see and where it can be seen. The first two, scheduled for release in the first half of 2005, are the guide to the Gardens as a whole and one on the myriad of water plants. These will be followed later in the year by one on trees and another focusing on the Ginger Garden. With a handy pocket size, affordable price and every subject illustrated by a half-page photograph, they will provide an instant snapshot to what to see in the Gardens.

In writing the general guide, the difficulty was what should be put in and what could be left out. What would visitors want to see? The first step was to ask SBG staff for their favourite spots in the Gardens and their favourite plants. What are the must-see things in the Gardens? So a quick poll of SBG staff was carried out. Of course, there was some bias in the replies – staff who worked with orchids thought orchids were the most important, while others thought trees or water plants should top the list.

In answer to the question 'If you were to show visitors just one place in the Gardens, what would it be?' The National Orchid Garden came out top (22% of replies), closely followed by the Eco-Lake, Ginger Garden and Palm Valley (each polling 15%) and the Bandstand (11%). Eight other places filled the remainder of the list.

Asked to choose their three most favourite places, the answers were slightly different with the Ginger Garden topping the list, followed by the National Orchid Garden, Bandstand and Palm Valley; and coming in third, the Eco-Lake, the Cool House and Symphony Lake. Altogether 25 different places were chosen showing that the Gardens means many things to many people. Not surprising when you consider that the Gardens offers several specialist gardens, three lakes each with their own distinct character, rich collections of particular groups of plants, and historic features like the Rain Forest, Palm Valley, the Bandstand. In fact, the visitor is spoilt for choice of what to see.



The Mist House in the National Orchid Garden

When it comes to favourite plants, considering the Gardens displays almost 6,000 species, the answers were not surprisingly even more varied. In answer to what was the most favourite plant, there were almost as many answers as staff. Only the tembusu and the Victoria waterlily were cited by more than one staff member. When asked



Our famed tembusu tree

to name their three most favourite plants, the tembusu - the one with the long horizontal branch that is featured on the S\$5 currency note - came out a clear winner being chosen by almost half the staff. Altogether 44 plants were chosen with the yellow rain trees in second place, the massive kapok tree with its snaking roots was third with the monkey pot tree, the torch ginger, the double coconut and Vanda Miss Joaquim all sharing fourth place.

All of these must-see features and plants and more will be included in the Pocket Guide to the Singapore Botanic Gardens, but an 80-page guide will not be able to showcase the full riches of the Gardens' collections, which is why the specialist gardens and groups of plants, like the water plants and trees, will be the subject of their own Guide Book and will be able to give more comprehensive coverage of the Gardens large and diverse array of plants.

*Ruth Kiew*  
Herbarium & Library



# Rare Visitor to the Gardens

I had a very interesting day on the 24<sup>th</sup> September 2004. As I approached the library at 6.50 am, I found the body of a bird on the floor near the main entrance glass door. It had apparently knocked itself out against the glass. I brought it into the library and was amazed by its very bright colours. It awoke, looked at me for a while and flew around the book shelves occasionally hitting its head on the ceiling, finally coming to rest at the back of the library.

Although it looked like a kingfisher, I was not sure what kind it was and called my colleagues from the Sungei Buloh Wetland Reserve for help.

Tay Soon Lian and Jeremy Ang from Sungei Buloh Wetland Reserve responded immediately and appeared later in the morning. Within minutes Jeremy had the bird in his gentle hand. He said that it was easily caught because it was dehydrated and tired. We fed it sugared water using a straw and soon it regained strength and started pecking our hands. From books in the library we identified this gorgeous bird as the **Black-backed Kingfisher** (also called **Oriental Dwarf Kingfisher**), *Ceyx erithacus*. Only the size of a sparrow (12.5–14 cm), this is a brilliantly coloured bird. The body is reddish orange on the upperpart and yellow below with a brilliant lilac line down the centre of rump and upper tail. The wings are black



The brilliantly coloured and stunning Oriental Dwarf Kingfisher

with blue splashes and the throat white. There are white patches behind the ears and it has brilliant vermilion bill and feet.

This kingfisher is one of the most exciting birds of the South East Asian rain forest. This extremely shy jewel of the forest is usually encountered by chance. It feeds on small insects, spiders and possibly fish as well. It has a soft but penetrating whistle, somewhat like the common Kingfisher. It is from further north and is a rare winter visitor to Singapore. According to one bird expert "this

kingfisher is the rarest of our kingfishers, if it was to become extinct, something of gladness would go out from nature." This beauty was then taken back to the Sungei Buloh Wetland Reserve to have its photograph taken, and to be measured, ringed and later released.

It was certainly an exciting morning documenting the first record of this rare bird to the Gardens.

Christina Soh  
Library

## EDUCATION OUTREACH

### Evolution Garden for Teachers

In conjunction with planning and implementing the final stages of the new Evolution Garden, six sessions of *Evolution Garden Introductory Talk and Tour*, were conducted for primary and secondary school teachers from September to November 2004.

The talks and tours were planned as sharing sessions for us to garner feedback to help us plan and implement the finishing touches to the Garden so that we may better serve the needs of schools.

The introductory sessions received overwhelming response. Over 180 school

teachers from 60 different primary and secondary schools have participated. We thank officers from the Curriculum Planning & Development Division and the Gifted Education Branch of the Ministry of Education who helped us facilitate these sessions.

In each one and a half hour introductory session, participating teachers were given an introduction to the Garden as well as a tour. These were followed by a discussion on its features and attractions and possible outreach programmes that we can offer to schools.



Janice introducing the models of the giant *Lepidodendron*





Camelia explaining the fern collection to teachers

Winnie Wong

In general, most teachers found the Evolution Garden an interesting and innovative concept in garden design as well as an eye-opener and described it as a rich living classroom for students to explore the history of life. Many teachers were fascinated by the authentic petrified wood and fossil displays of ammonites as well as reconstructed stromatolites, *Cooksonia* and giant *Lepidodendron*. The living specimens, especially the cycads, also caught the teachers' attention.

The introductory sessions were fruitful sharing opportunities for us. Taking into consideration the valuable feedback we obtained from the teachers, changes were made to our proposed outreach programme and ideas for new ones were developed. We will also be planning for the creation of additional children-friendly interpretation for the Garden.

Winnie Wong  
Education

## FROM THE ORCHID SPECIES COLLECTION

### Ultra Tough on Ultrabasic

The archipelago connecting Asia and Australia is one of the world's most geologically active areas. The geological maps of this area are a dense patchwork of many different rock types, torn apart and squeezed together again by underground movements. Some of these rocks weather to fertile soils that can be tilled for years, like those on the slopes of the numerous volcanoes. Other bedrock types will not yield a single crop even to the most careful farmer. Ultrabasic rocks (mainly serpentinites), igneous rocks from the floor of ancient oceans, are notorious in this respect. The world's largest outcrops of this rock type are found in East Sulawesi. They very easily dry out, they are deficient in most elements that make a fertile soil, and the levels of toxic heavy metals, like cadmium, nickel, copper and manganese, abounding in the bedrock, are very high.

It is a harsh environment, and much of the area is covered by a low, often open and shrubby forest of a typical dark green colour. Many plant species will not survive here, but some have adapted to the environment, and even developed a tolerance to the toxic components in the soil. The next step in evolution, of course, is the development of species that are endemic to this environment, and that do not occur anywhere else. The Gardens' species collection includes two such endemic orchids from the East Sulawesi serpentinites.

*Spathoglottis tricallosa* grows as small hummocks lining rare trickles of water flowing down slopes covered with shrubby, very dry forest otherwise devoid of orchids. All it needs is a water-soaked cleft in the rock, filled with some organic matter, to grow. In our greenhouses, it grows well in a pot filled with fine gravel mixed with some peat, with a topping of moss. It flowers almost continuously. We have two different colour forms; both are shown here.

*Bulbophyllum univenum* has an equally restricted range. It grows on the shores of the three large lakes in the area, up to some 10 m above the water line. It either roots in thin soil, creeps over rocks or straggles through dense vegetation. In the greenhouse it grows well on a slab of tree fern root. Flowering seems to be very restricted but massive when it occurs, usually in June-July.

On the whole, little is known of the orchid flora of these areas in Sulawesi. It is certain that many more interesting orchids with a very restricted range are waiting to be discovered. The bad news is that logging, fire, and strip-mining cause extensive damage in the area.

J J Vermeulen  
Paul Leong  
Herbarium

Photos by: J J Vermeulen



The two forms of *Spathoglottis tricallosa* showing distinct colouration of the side lobes of the lip – light purple with spots (above) and a pastel yellow (below)



*Bulbophyllum univenum*



# The Beginning of the End

In August 1920, Talipot seeds were introduced from the Calcutta Botanic Gardens, India. The seedlings were planted in the Palm Valley in 1925 and now after 79 years, two **Talipot Palms** (*Corypha umbraculifera*), flowered from October 2004 to January 2005.

This palm flowers only once in its lifetime, producing the biggest inflorescence in the flowering kingdom. The palm grows for 30 to 80 years, storing up energy and strength in its trunk to send out this massive inflorescence. After flowering and fruiting the plant will die.

The tough and flexible young leaves of the Talipot Palm, like those from the Palmyra Palm (*Borassus flabellifer*), have been used since ancient times as paper. A great deal of the original Buddhist scripture was recorded on the leaves of the Talipot Palm. Almost all parts of the plant are useful. The timber is used for construction, the leaves for thatch and weaving and buttons may be made from the hard endosperm of the seed. Wine can be tapped from the emerging flower stalk, sago starch harvested from the trunk and the palm heart can be eaten.

Widely cultivated in southern India and Sri Lanka, it is the national tree of Sri Lanka. This giant solitary palm is the largest of the fan palms and will grow up to 25 m tall with a 1 m diameter at the base. The huge fan-shaped leaves may reach 5 m across. The upper part of the trunk is typically covered with persistent leaf bases.

The flowering stalk grows to 6 m tall and may bear over 20 million tiny cream flowers. The golfball-sized dull green fruits will take almost a year to mature. Gradually, all the food reserves accumulated in the trunk over the decades would be used up and the plant dies. This mode of life is called monocarpic which mean 'once fruiting'.

A flowering Talipot is truly a rare and impressive sight. To see two massive palms flowering simultaneously is a once-in-a-lifetime treat. The Talipot Palm has flowered in the Gardens before in 1984 and 1996.

In India and Sri Lanka, more than a year after flowering, hundreds of thousands of fruits will be ripe and begin to rain down. By then all the leaves will be dead and drooping. However, in SBG, after the last massive flowering, only a handful of fruits were produced suggesting that the right pollinator is absent in the Gardens.



The tiny flowers are each just 6 mm across

Chin See Chung

Botanists have suggested that the advantage of flowering once in a lifetime is that such a large quantity of fruit produced all at once cannot possibly all be eaten by predators so that plenty of new plants will survive and replace the mother plant.

We owe it to our predecessors who had the foresight to plant these majestic palms. In the same way, we should be planting more for the next generation.

*Ohn Set*  
*Living Collections*





Lady McNeice

The young inflorescence on 10<sup>th</sup> Oct 2004 - more than a month after its emergence



Lady McNeice

The emerging inflorescence on 13<sup>th</sup> Nov 2004; lower leaves have drooped



Lady McNeice

The inflorescence branches are fully formed, but the flowers have yet to open  
(photo taken on 3<sup>rd</sup> Dec 2004)



Chin See Chung

The fluffy inflorescence with millions of tiny flowers (photo taken on 3<sup>rd</sup> Jan 2005)



### Goraka, *Garcinia gummi-gutta*

*Garcinia gummi-gutta* (synonym *Garcinia cambogia*), commonly called Goraka or Camboge, is a minor economic tree in the same genus as the well-known mangosteen, *Garcinia mangostana*, from the family Guttiferae. Goraka is native to India and Sri Lanka.

It is a medium sized tree that can grow to 20 m tall. It has an interesting crown with drooping branches and dark shiny green leaves. Trees either have male or bisexual flowers. The fruits are 5-7 cm across and look like little pumpkins with broad longitudinal ridges. When fully ripe, it turns orangey pink.

Goraka takes 10–12 years before it begins to bear fruit. The useful part of this tree is its highly acidic mature fruit. The rinds of the ripe fruits are processed and used in India and Sri Lanka as a spice or condiment for flavouring curries in place of tamarind. It has now gained international fame after it was found that hydroxycitric acid (HCA) can be extracted from the fruit. This is used in medicines to control obesity. It is also one of the ingredients in many ayurvedic medicines.

The specimen in the Gardens, planted in the Economic Garden near the Eco-lake, was grown from seed given to the Gardens by Tenom Agriculture Park, Sabah, Malaysia, in October 1991. It is now a handsome tree about 10 m tall. This tree has just begun to bear fruit but as yet seems to fruit sparingly.

*Andrea Kee*

*Plant Resource Centre*

*Photos by: Andrea Kee*



*Garcinia gummi-gutta*



The 5 cm wide pumpkin-like fruit



## TAXONOMY CORNER

# Synonyms – Names that fall by the wayside when plants change their name

Probably the commonest reason for name changes is the rule in the International Code of Botanical Nomenclature that states that a plant species can have only one name and that the oldest one should be used starting from those published in Linnaeus's *Species Plantarum*, 1753 (see *Gardenwise* 21:26, for more). This is called priority of names.

Often this means that a name we are all familiar with suddenly changes. One such example is the Sealing Wax Palm, which we happily called *Cyrtostachys lakka*. The 'correct' name is *Cyrtostachys renda* because Blume described the Sealing Wax Palm in 1838 as *Cyrtostachys renda*, while Beccari (unaware that it had already been described) named it *Cyrtostachys lakka* in 1885.

Another example that affects a tree commonly planted in the Gardens is *Saraca thaipingensis* Cantley ex

Prain. This name was published in 1897 but *Saraca cauliflora* Baker, which was published earlier in 1876, is now the accepted name.

When *Cyrtostachys renda* becomes the accepted name; the other name, in this case *Cyrtostachys lakka*, is called a synonym. This has important implications for data retrieval, because if you search for information about the Sealing Wax Palm under *Cyrtostachys renda*, you will only get a fraction of the information available. You need to search under *Cyrtostachys lakka* too! So, although knowing the scientific name is the key to all that is known about a plant, knowing all its synonyms is crucial if the search is to be complete.

An international committee can, however, make exceptions and rule that a later plant name be kept (conserved) if it is applied to a well-known or economically important



*Cyrtostachys renda* Blume  
(synonym: *Cyrtostachys lakka* Becc.)

plan. Unfortunately, tropical species rarely qualify as well-known so we can continue to expect name changes.

**Ruth Kiew**  
Herbarium

## STAFF NEWS

For his contribution and dedication to orchids in Singapore and internationally, our CEO, Dr Tan Wee Kiat, has been honoured with the prestigious Gold Medal of Achievement Award by the American Orchid Society. The award was presented to Dr Tan on the 14<sup>th</sup> January 2005 during the 75th Anniversary celebration of the Orchid Society of South East Asia, Singapore. So far only 55 individuals have been bestowed with this honour including Prof R.E. Holttum who served as the Director of Singapore Botanic Gardens from 1925 to 1949.

We heartily congratulate Dr Tan.



Dr Tan Wee Kiat (right) receiving the Gold Medal of Achievement Award from the American Orchid Society's Honorary Vice President and Trustee, Mr Peter Furniss



## STAFF NEWS



Koh Sin Lan

The Curcuma team at Professor Pimchai's nursery at the University of Chiang Mai

From 3<sup>rd</sup>-13<sup>th</sup> October 2004, Ruth Kiew and Serena Lee from the Herbarium carried out a detailed botanical inventory of **Bukit Sarang**, a limestone hill in Sarawak. Over 200 plant species were collected including new and rare ones. The collection trip was carried out in collaboration with the Herbarium, Sarawak Forestry Corporation and was made possible through a grant from Grand Perfect Sdn. Bhd.



Ruth Kiew

The expedition team busily traversing the wilds of Bukit Sarang, Sarawak



Serena Lee

Serena Lee (far right) and other participants at the BRAHMS training course in Leiden, the Netherlands

Serena Lee participated in an **advanced training course on BRAHMS** (Botanical Research and Herbarium Management System) held in the National Herbarium of the Netherlands, Leiden University Branch, the Netherlands, from 16<sup>th</sup>-27<sup>th</sup> October 2004, organized by the South East Asia Botanical Collections Information Network (SEABCIN). Whilst there, she also paid a study visit to the Museum Naturalis, the National Museum of Natural History.

Editors

## KEY VISITORS TO THE GARDENS (Jul- Dec 2004)



NParks

The orchid naming ceremony of *Mokara Bertie Ahern* held on 12th Oct 2004, in honour of HE Bertie Ahern, Prime Minister of Ireland. On his right is Dr Tan Wee Kiat, CEO, NParks



NParks

A new orchid hybrid, *Dendrobium Sonja*, was named on the occasion of the visit of the King and Queen of Norway, HM Harald V and HM Sonja on the 28<sup>th</sup> October 2004



# KEY VISITORS TO THE GARDENS (Jul- Dec 2004)

NAME	FROM
Mr Andrew Tuggey	Secretary of the House of Commons, UK
HE Bertie Ahern	Prime Minister of Ireland
Mr Chan Han Hee	Director of Industrial and Ornamental Crops, Department of Agriculture, Malaysia
Ms Chen Lauren	Deputy Chief of Guangdong Education Services of International Exchange, China
Dr Ching Lee	University of Malaya, Malaysia
Mr Cho Jae Hyun	First Secretary of the Embassy of the Republic of Korea in Singapore
Ambassador Choi Seok Young	Deputy Executive Director of APEC Secretariat
Dr David Middleton	Harvard University Herbaria, USA
Hon. Demetrio L. Ignacio Jr.	Undersecretary of the Department of Environment and Natural Resources, Republic of the Philippines
HRH Prince Edward	Earl of Wessex, UK
HE Enok Nygaard	Ambassador of the Royal Norwegian Embassy in Singapore
Ms Fatimah Mohamed	Universiti Kebangsaan Malaysia, Malaysia
Dr Gabriel Castillo	University of Liege, Belgium
Dr George Weiblen	University of Minnesota Herbarium, USA
Ms Geraldine Joslyn Fraser-Moleketi	Minister for Public Service and Administration, Republic of South Africa
Datuk Halimah Mohd Sadique	Chairman of Johore Local Government and Health Committee, Malaysia
HM Harald V and HM Sonja	King and Queen of Norway
Mr Harry Barnes	Member of Parliament for North East Derbyshire, House of Commons, UK
Mr Higashi Jyun	Director of the Commemorative Foundation for the International Garden and Greenery Exposition, Japan
Mr Huang Weiyu	Party Committee Member of Nanhai Yanbu District, Guangzhou, China
Mr Imai Mitsuru	Member of the Sagami-hara City Council, Japan
Mr Isa Shuaibu	Director of Parks and Recreation Department, Ministry of the Federation Capital Territory, Nigeria
Datuk Dr Isahak Yeop Mohamed Shar	Secretary-General of the Ministry of Natural Resources and Environment, Department of Environment, Malaysia
Ms Jana Skornickova	Charles University, Prague, Czech Republic
Dr Jane Goodall	Primatologist and Conservationist
HE Jean-Paul Reau	Ambassador of the French Embassy in Singapore
Mrs Jeon Sang Soo	Administrator, Namgu District Office, Busan, Republic of Korea
Ms Joan T. Pereira	Sabah Forest Department Herbarium, Sabah, Malaysia
Mr Joar Lonning Strand	Deputy Head of Mission and First Secretary of the Royal Norwegian Embassy in Singapore
Mr John MacDougall	Labour Member of Parliament for Central Fife, House of Commons, UK
General John P. Jumper	Chief of Staff, United States Air Forces, USA
Mr Kevin Kern	Pianist
HE Kim Sung Sin	Minister for Small and Medium Businesses, Republic of Korea
Mr Kim Won Ki	Speaker of the National Assembly, Republic of Korea
Dr Leni Bjorklund	Minister for Defence, Sweden
Dr Liana Bratasida	Deputy Minister for Environmental Conservation, Ministry of Environment, Republic of Indonesia
Mr Lindsay Hoyle	Labour Member of Parliament for Chorley House of Commons, UK
Mrs Lourdes S. Tabamo	Senior Official of the Department of Foreign Affairs, Republic of the Philippines

NAME	FROM
Mr Mallam Nasir El-Rufai	Minister for the Federal Capital Territory, Republic of Nigeria
Mr Maudhy Setiawan	Media Communications Department, Damba Intra., Jakarta, Indonesia
Mr Mike Crawford	Director of International Development, Walt Disney Parks and Resorts, USA
Mr Mukunda Raj Panthi	Secretary of Ministry of Local Development, Pulchowk, Lalitpur, Nepal
HE Dato' N Parameswaran	High Commissioner of Malaysian High Commission in Singapore
Dr Nguyen Quoc Trieu	Chairman, Hanoi People's Committee, Socialist Republic of Vietnam
Mr Nico Barito	Co-Chair of Regional Government Network for Sustainable Development, Jakarta, Indonesia
Mr Nigel Evans	Member of Parliament for Ribbles Valley and Fulwood House of Commons and Vice Chairman of the Conservative Party, UK
Mr Oh Jae Hack	Deputy Chief of Mission and Minister of the Embassy of the Republic of Korea in Singapore
Mr Olarn Tungtratrakul	Deputy Secretary of Sriracha Municipality, Thailand
HE Ong Keng Yong	Secretary-General of ASEAN Secretariat
Mr Park Doo Soon	Program Director of APEC Secretariat
Mr and Mrs Pasquale Pistorio	Honorary Citizen of Singapore
Mr Patrick Janssens	Mayor of Antwerp, Belgium
Hon. Prof. Peter Kasenene	Minister of State for Finance, Planning and Economic Development (Privatisation), Republic of Uganda
HRH Raja Nazrin	Crown Prince of Perak, Malaysia
Dr Robert Johns	Royal Botanic Gardens, Kew, UK
Mr Robert Walter	Member of Parliament for North Dorset, House of Commons, UK
Dr Rogier de Kok	Royal Botanic Gardens, Kew, UK
Ms Rosanizah Tuman	Visitor Complex Manager, Taman Warisan Pertanian (Agriculture Heritage Park), Putra Jaya, Malaysia
HE Ryu Kwang-Sok	Ambassador of the Embassy of the Republic of Korea in Singapore
Mr Sarawood Sungkaew	Faculty of Forestry, Kasetsart University, Thailand
Ms Shawn Krosnick	Ohio State University, USA
HH Sheikh Sabah Al-Ahmed	Prime Minister of the State of Kuwait Al-Jaber Al-Sabah
Mr Shi Yuchu	Vice Chairman of System Integration and Intellectual Property Authoring Centre (SIPAC), Republic of Korea
Mrs Somsavat Lengsavad	Spouse of Deputy Prime Minister and Foreign Minister, Lao People's Democratic Republic
Mr Sun Peisen	Director of Park Bureau, Shandong Province, Jinan City, China
Mdm Susan Jalaluddin	Rimba Ilmu, University of Malaya, Malaysia
Dr Teofila Beaman	Michigan State University, USA
Dato' Dr Tan Hian Tsin	Honorary Counsel of the Republic of Uganda in Singapore
HE Teo Eng Cheng Michael	High Commissioner of the Republic of Singapore in UK
Mr Theodore C. Sorensen	Former Policy Advisor, Legal Council and Speech Writer to President John Kennedy, USA
Prof Vincent Demoulin	University of Liege, Belgium
Mrs Wantanee Petchampai	Environmental Specialist of the Office of Environmental Policy and Planning, Thailand
Mr Yang Zhen Qiu	Deputy Chief, Panyu Party Organising Committee, Guangzhou, China
Dr Yoichi Tateishi	University of the Ryukyus, Japan



## FROM THE ARCHIVES

### *The Vanished Forests of Singapore Recaptured*



**Weg durch den Sumpf (Tschängi)  
(Path across the Swamp (Changi))**

Hand-coloured lithograph by Eduard von Ransonné published in *Skizzen aus Djohore und Singapur*. (Sketches from Johore and Singapore), 1876

A question we are asked from time to time is why the Sealing Wax Palm was chosen as the Gardens' logo. One obvious reason is that it is an elegant palm with arching leaves and a striking red crownshaft (the sheathing leaf bases), which is a very unusual character in palms. Indeed, in Malay it is called *pinang raja* (the Rajah's betelnut palm). But that cannot be the whole answer because many other plants are equally attractive in their different ways.

The clinching reason is that the Sealing Wax Palm is a native of Singapore where it once grew in swamp forests. It has been recorded from swamp forests from Kranji, Jurong, Mandai and Tuas. However, these swamps were drained and the land developed more than sixty years ago and together with the swamp went the Sealing Wax Palm, which is now extinct in Singapore. (It is still plentiful in Malaysia and Sumatra and, of course, in gardens).

This makes our hand-coloured lithograph published in 1876 in *Sketches from Johore and Singapore* (*Skizzen aus Djohore und Singapur*) all the more valuable as it accurately portrays not only the Sealing Wax Palm (*Cyrtostachys renda*) but it also captures the appearance of the swamp forest in Changi and its plant community with *nipa* (*Nypa fruticans*) and *mengkuang* (*Pandanus* sp.), all of which have long since been swept away.